538103

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 June 2004 (24.06.2004)

PCT

(10) International Publication Number
WO 2004/054092 A1

(51) International Patent Classification[7]: H03D 7/00

(21) International Application Number:
PCT/IB2003/005144

(22) International Filing Date:
12 November 2003 (12.11.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
02080247.6 11 December 2002 (11.12.2002) EP

(71) Applicant *(for all designated States except US)*: **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **BERGERVOET, Jozef, R., M.** [NL/NL]; c/o Prof . Holstlaan 6, NL-5656 AA Eindhoven (NL). **STIKVOORT, Eduard, F.** [NL/NL]; c/o Prof . Holstlaan 6, NL-5656 AA Eindhoven (NL).

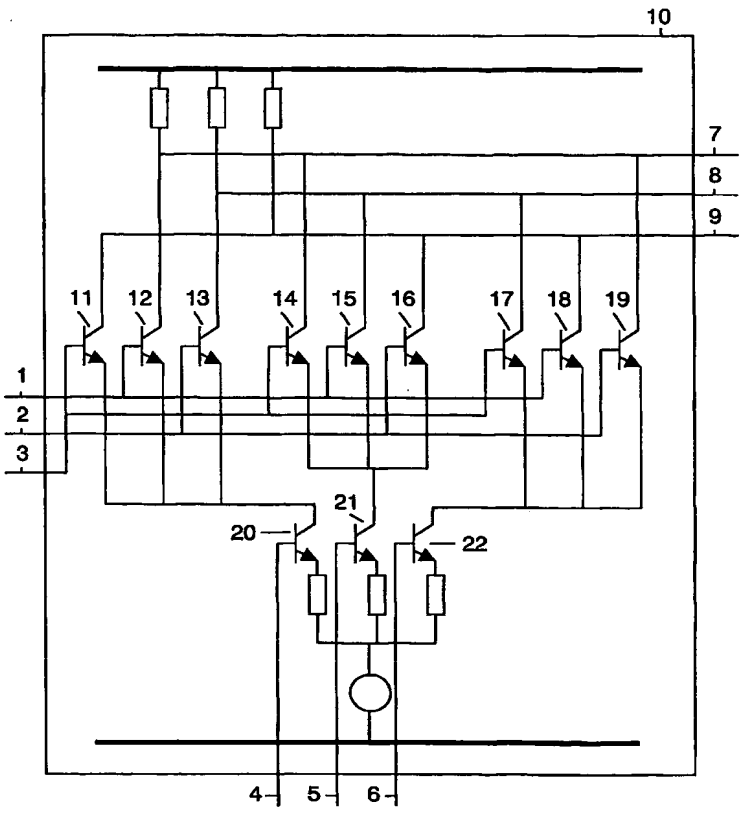
(74) Agent: **DUIJVESTIJN, Adrianus, J.**; Philips Intellectual Property & Standards, Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,

[Continued on next page]

(54) Title: THREE-PHASE MIXER-SYSTEMS



(57) Abstract: Mixer-systems for up/down-converting frequencies comprise many components: in case of balanced quadrature conversion, some parts will show a fourfold repetition (insight). By creating a three-phase mixer-system (10,40), less components will be necessary (basic idea). The sub-signals in the group of sub-signals at the sub-outputs have phase differences being present between two subsequent sub-signals within an interval of 100-140 degrees, which makes these sub-signals already (substantially) balanced. In case of said phase differences being each within an interval of 118-122 degrees, the sub-signals are even better balanced, and when being 120 degrees, the sub-signals are perfectly balanced. A group of transistors (11-13,14-16,17-19,41-43,44-46,47-49) per sub-input (1,2,3) switches and/or amplifies the sub-signals at the sub-inputs. In an active mixer-system (10), said groups of transistors (11-13,14-16,17-19) are switched by further transistors (20-22). In a passive mixer-system (40) said groups of transistors (41-49) are in dependence of the group of sub-signals at the further sub-inputs (4,5,6) switched from low/high to high/low impedance.

WO 2004/054092 A1